

animals were significantly smaller than those in the Rh2 treated animals
($p < 0.05$).

5 **[0061]** Figure 7 illustrates a flow chart of two processes which can be used to
obtain the sapogenins according to the invention.

10 **[0062]** As will be apparent to those skilled in the art in the light of the foregoing
disclosure, many alterations and modifications are possible in the practice of this
invention without departing from the spirit or scope thereof. Accordingly, the
scope of the invention is to be construed in accordance with the substance defined
by the following claims.

CITED REFERENCES

1. Kim ND, Park MK, Lee SK, Park JH, Kim JM (1998) Processed ginseng product with enhanced pharmacological effects. US Patent No. 5,776,860.
- 5 2. Lee YN, Lee HY, Chung HY, Kim SI, Lee SK, Park BC, Kim KW (1996) In vitro induction of differentiation by ginsenosides in F9 teratocarcinoma cells. *Eur J Cancer*. 1820-8
3. Odashima S, Ohta T, Kohno H, Matsuda T, Kitagawa I, Abe H, Arichi S (1985) Control of phenotypic expression of cultured B16 melanoma cells by plant glycosides. *Cancer Res*. 85: 2781-8
- 10 4. Xia LJ, Han R (1996) [Differentiation of B16 melanoma cells induced by ginsenoside Rh2]. *Yao Hsueh Hsueh Pao*. 31: 782-5
5. Kikuchi Y, Sasa H, Kita T, Hirata J, Tode T, Nagata I (1991) Inhibition of human ovarian cancer cell proliferation in vitro by ginsenoside Rh2 and adjuvant effects to cisplatin in vivo. *Anti-cancer Drugs*. 2: 63-7
- 15 6. Lee KY, Park JA, Chung E, Lee YH, Kim SI, Lee SK (1996) Ginsenoside-Rh2 blocks the cell cycle of SK-HEP-1 cells at the G1/S boundary by selectively inducing the protein expression of p27kip1. *Cancer Lett*. 110: 193-200
- 20 7. Oh M, Choi YH, Choi S, Chung H, Kim K, Kim SI, Kim DK, Kim ND (1999) Anti-proliferating effects of ginsenoside Rh2 on MCF-7 human breast cancer cells. *Int J Oncol*. 18: 869-75
8. Ota T, Maeda M, Odashima S, Ninomiya TJ, Tatsuka M (1997) G1 phase-specific suppression of the Cdk2 activity by ginsenoside Rh2 in cultured murine cells. *Life Sci*. 60: PL39-88
- 25 9. Nakata H, Kikuchi Y, Tode T, Hirata J, Kita T, Ishii K, Kudoh K, Nagata I, Shinomiya N (1998) Inhibitory effects of ginsenoside Rh2 on tumor growth in nude mice bearing human ovarian cancer cells. *Jpn J Cancer Res*. 89: 733-80
- 30 10. Kim HE, Oh JH, Lee SK, Oh YJ (1999) Ginsenoside RH-2 induces apoptotic cell death in rat C6 glioma via a reactive oxygen- and caspase-dependent but Bcl-X(L)-independent pathway. *Life Sci*. 65: PL33-80
11. Park JA, Lee KY, Oh YJ, Kim KW, Lee SK (1997) Activation of caspase-3 protease via a Bcl-2-insensitive pathway during the process of ginsenoside Rh2-induced apoptosis. *Cancer Lett*. 121: 73-81
- 35 12. Jia W (2000) Ginsenoside Chemotherapy. U.S. Patent Provisional File - Serial No. 60/204/765

13. Shinkai K, Akedo H, Mukai M, Imamura F, Isoai A, Kobayashi M, Kitagawa I (1996) Inhibition of in vitro tumor cell invasion by ginsenoside Rg3. *Jpn J Cancer Res.* 87: 357-62.
14. Liu WK, Xu SX, Che CT (2000) Anti-proliferative effect of ginseng saponins on human prostate cancer cell line. *Life Sci.* 67(11):1297-306.
- 5 15. Iishi H, Tatsuta M, Baba M, Uehara H, Nakaizumi A, Shinkai K, Akedo H, Funai H, Ishiguro S, Kitagawa I (1997) Inhibition by ginsenoside Rg3 of bombesin-enhanced peritoneal metastasis of intestinal adenocarcinomas induced by azoxymethane in Wistar rats. *Clin Exp Metastasis* 15: 603-11.
- 10 16. Mochizuki M, Yoo YC, Matsuzawa K, Sato K, Saiki I, Tono-oka S, Samukawa K, Azuma I (1995) Inhibitory effect of tumor metastasis in mice by saponins, ginsenoside-Rb2, 20(R)- and 20(S)-ginsenoside-Rg3, of red ginseng. *Biol Pharm Bull.* 18: 1197-202.
- 15 17. Hasegawa H, Jong HS, Matsumiya S, Uchiyama M, Jae DH (1999) Metabolites of Ginseng Saponins by Human Intestinal Bacteria and Its Preparation for an Anti-cancer. U.S. Patent No. 5,919,770.